of colourless silica. The yellow solution afforded distinct evidence of the presence of manganese and iron.

The deeply-seated black and brown spots of the pale variety of the guillemot's egg were found to contain manganese, iron, and silica.

When muriatic acid is employed to remove the epithelium and dissolve the calcareous part of the egg of the lapwing, the natural colour is changed to green. If the shell, not deprived of epithelium nor the membrane of the albumen, be boiled two or three hours in concentrated solution of potass, it yields a dark yellow solution; the deeply-seated dark spots are now changed to red-brown. The yellow solution supersaturated by acetic acid yielded a brown flocculent precipitate; the supernatant fluid, still yellow, afforded traces of the presence of copper. If the shell, after being treated with potass, be now dissolved in very dilute muriatic acid, there only remain a few cobweb-like flocks. The solution contains lime, phosphate of magnesia, and phosphate of lime.

The pale variety of the guillemot's egg affords no trace of magnesia, but contains carbonate and phosphate of lime.

EXPLANATION OF PLATE VII.

Fig. 1. Epithelium and basement membrane of ostrich's egg.
— 2. The same from the egg of the emeu.
— 3. Superficial layer of the egg of the foolish guillemot; it may be most properly described as a cellulo-granular membrane having a tendency to become cracked into polygonal pieces. A few pigment-cells? are seen at one corner.
— 4. Epithelium from the egg of the missel thrush.
— 5. Epithelium and basement membrane of an imperfectly calcified egg from the dilated oviduct of a land rail.
— 6. Epithelium from the egg of *Carbo Floridanus*, Audub.
— 7. Epithelium from the egg of *Ardea Herodias*, Linn.
— 8. Epithelium from the egg of the redstart.
— 9. Deep-seated pigment-cells from the egg of *Sterna Hirundo*, Linn.
— 10. Epithelium from the egg of the greenfinch.
— 11. A layer subjacent to the true epithelium; it is the seat of the colour. From the egg of *Turdus mustelinus*, Gmelin.

XIX.—*On the Insects of Jamaica.* By PHILIP HENRY GOSSE.

[Continued from p. 114.]

21. *Heliconia Charitonia.* Of the extensive family *Heliconiadæ*, almost peculiar to tropical America, this is the only species that I ever met with in Jamaica; a circumstance which is the more remarkable, as several others have long been known as common to that island and the other Antilles. This however is perhaps the most abundant Lepidopterous insect we have; I do

not recollect any situation (except the interior of the forest) nor any season of the year in which it was not common. It was one of the very first objects that arrested my attention on first setting my foot on shore at Alligator Pond in December: its beauty and singularity of form, the great length and little breadth of the wings, the length and slenderness of the body, and the brilliant contrasts of colour, lemon-yellow and velvety-black, together with the very peculiar flapping of the wings, as if their length rendered them somewhat unwieldy, gave me a sensation of delighted surprise. It is very easily captured, being slow of flight and fearless: it flutters heavily along over low herbage at the sides of roads, &c., rarely mounting as high as one's head, except when alarmed. Low situations and the immediate neighbourhood of the sea-shore appear to be most affected by it. The commonness of this species has not presented to me any facts to lessen the profound ignorance that exists concerning the earlier stages of the insects of this elegant family.

The following note, though it has already appeared in print, I may add, as its omission would render the history of the species imperfect. Just behind the cottage of Content, a narrow, almost impassable foot-path winds along the steep mountain side, through tall bushes, to a secluded little plantation at some distance, embosomed in the forest, and known from its produce as the Coffee-walk. As we climb over the fragments of stone that lie in irregular masses blocking up the way, or scramble round their projecting points, we discover several cavernous recesses of greater or less depth and darkness, between the rock. In one of these, over the mouth of which hung down some bushes and trailing plants, I observed one evening just before sunset, near the end of August, a little swarm of these butterflies. They were about twenty in number, and were dancing to and fro, exactly in the manner of gnats, or as the *Hepioli* play at the edge of a wood. After watching them awhile, I noticed that some of them were resting with closed wings at the extremities of one or two slender depending creepers. One after another fluttered from the group of aërial dancers to the reposing squadron, and alighted close to those already settled, so that at length, when only about two or three of the fliers were left, the rest were collected in groups of half-a-dozen each, so closely packed together that each group might have been grasped in the hand. When once one had alighted, it did not, in general, fly again, but a new-comer, fluttering at the group and seeking to find a place, sometimes disturbed one recently settled, when the wings were thrown open and one or two would fly up again. As there were no leaves on the hanging stems, the appearance presented by these beautiful butterflies, so crowded together, their long, erect wings pointing in different directions, was not a little curious. An observant young friend residing near the spot, to whom I have been indebted for much valuable information in natural history, assured me, that every evening these *Heliconiæ* assembled in the same manner and performed the same evolutions, and that I had not seen a third part of the numbers often collected in that spot for the night's repose.

I should add, that this association, at least as far as I am acquainted with the habits of the species, seems exclusively nocturnal: during their diurnal flight I have never observed anything like sociality, with the exception of pairing individuals.

22. *Colænis Delila.* Nearly equally abundant with the preceding, this species is generally to be seen in the same localities. It is a low flier, flitting with fitful irregularity over the shrubs and herbaceous plants that are almost always in blossom by the sides of roads, on which it frequently alights. It is captured with ease, though, when alarmed, it is capable of powerful and rapid flight.

23. *Agraulis vanillæ.* This richly-silvered Fritillary is also an abundant species in the lowlands at all seasons. It affects waste fields, pastures, road-sides, the rank and tangled vegetation that fringes the edges of woods and similar situations, beating with irregular undulating motion over the flowers. It usually keeps near the ground.

The Jamaican specimens of this butterfly are all much smaller and less richly coloured than those of the same species which I have taken in Alabama, U.S.

The three species just mentioned, with *Cystineura Mardania, Anartia Jatrophæ* and *Paphia Portia,* are the most commonly occurring Lepidoptera in the winter months: in the spring, though these do not diminish in abundance, the *Pieridæ* begin to be abundant, and as the summer advances, the *Papilionidæ, Nymphalidæ* and *Hesperiadæ* become sufficiently numerous to divide the attention of the observer with the former.

24. *Euptoieta Hegesia.* This insect occurred sparingly at all seasons; chiefly at Sabito and other low situations around Bluefields, and in the neighbourhood of the sea-beach. Its manners are much like those of the preceding species, and as it hovers about flowering plants it is not difficult of capture.

25. *Melitæa Proclea.* Not far from the building known as Bluefields Tavern, on the road leading to the Creek, there is, immediately above the sea-beach, a little patch of ground on which formerly stood a negro-hut, now in ruins. The castor-oil plant (*Ricinus palma-Christi*), and the physic-nut (*Jatropha curcas*), which are always planted around the houses of the peasantry, have increased on this little spot with unchecked luxuriance, and,

mingled with the spinous *Bromelia pinguin* and the equally formidable *Guilandina bonduc,* present a tangled and almost impenetrable maze. In this very limited space, not exceeding the length of about a hundred yards along the road, this new species of *Melitæa* is plentiful from the end of March, onward through the summer. Yet I have scarcely found it elsewhere. It flits in and out among the bushes, dancing over them, and alighting every moment; yet manifests no perceptible preference for blossoms. From its indifference to the presence of man and its local attachment, it is netted with the greatest ease.

26. *Melitæa Pelops.* Not less local than the preceding, this pretty, pigmy butterfly haunts a very different scene, where however it is found in the most profuse abundance. At the spot where the Short Cut through the Paradise morass crosses the Sweet River by a ford available only in the dry season, a few square yards of the western bank have escaped from the dominion of the spreading bushes of black withe and cockspur, and are covered with a soft, dense, and deep carpet of what, from its aspect and perfume, I suppose to be a species of thyme, out of which spring scattered shrubs of the pretty *Cleome pentaphylla.* Hundreds of these diminutive *Melitææ,* the most minute butterfly with which I am acquainted, throng this secluded spot*, hovering about the fragrant herbage a few inches above the ground, or resting on the slender stems; many fly to and fro, united in sexual *copula.* Not one is to be seen on the opposite bank of the narrow stream, half-a-dozen yards distant, nor does the species extend its haunt beyond the space named, on its own side: its limits are commensurate with those of the thyme. I have found it equally abundant whenever I have visited the place, but as this is not accessible in the rainy seasons, I can speak only of the winter and spring months. Nowhere else, however, have I at any time seen a single specimen.

There is little except difference in dimensions and peculiarity in local habitat to distinguish this species from the preceding; yet I feel satisfied that they are distinct.

27. *Melitæa* (sp. nov.? near *Tharos*). Less common than its congeners, this species yet occurred in some numbers in the summer months in the same locality as *M. Proclea,* and thence onward to the Creek. Its habits differ little from those of that species.

28. *Anartia Jatrophæ.* Throughout the year this delicately tinted butterfly is the constant companion of *Heliconia Charitonia,* with which species it might dispute the palm of abundance.

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* In my note of *Galeruca Domingensis* (*v. ante,* p. 110) the allusion to *Melitæa Proclea* is an error of nomenclature; *Pelops* is the species intended there.

In its fondness for ditches, banks, and other situations of dense rank herbage, in its swift but irregular and vacillating flight, often interrupted by the temptation of a flower, and in its general habits and aspect, it reminds the observer strongly of the common European *Vanessæ*.

29. *Vanessa Lavinia* (var. *Genoveva*?). Rather common in the winter and spring at Sabito and other lowland localities.

30. *Eurema Tecmesia*. This beautiful species, which in the markings of its wings both above and below cannot fail to recal the varied pattern of our own *Cardui* and *Atalanta*, I met with but rarely, and only in mountain localities. About the end of March I took two specimens playing around the summits of some flowering bushes, three or four yards high, at the brow of Bluefields Mountain. They often alighted to suck the blossoms, but were shy of approach, easily alarmed, swift but irregular and fitful in flight, and therefore captured with difficulty. In the middle of June I took another in the Bamboo Walk on Grand Vale Mountain, a sombre spot environed by the tall forest on one hand, and by the graceful overshadowing bamboos on the other, much resorted to by that striking butterfly *Gynæcia Dirce*, a species rarely met with in other localities. These are almost the only instances in which I obtained the present species, except once or twice on the Hampstead Road.

31. *Cybdelis Hyperipte*? Near the end of June 1846, as I was proceeding along the coast from Bluefields to Kingston in a little trading smack, we were lying windbound in a bight of the dreary, rocky and inhospitable shore, marked on the charts with the sufficiently appropriate name of Starvegut Bay. Having nothing to do on board, I took a walk on shore, climbing over the immense masses of fragmentary rock, against which the surf was beating and boiling with furious violence, and shooting up ever and anon white jets of vapour-like spray through the sea-worn holes. In the woods, which consisted largely of the cashaw (*Prosopis juliflora*), intermingled with some species of *Inga* and the great *Cactus Peruvianus*,—a vegetation totally different from that in the neighbourhood of Bluefields,—I observed a Vanessa-like butterfly, of brilliant blue iridescence, and some white spots near the tip of the fore-wings, which I doubt not belonged to this species. I had never met with it before, and as I had no net with me, I did not capture any now. It was however in some abundance; flitted along close to the ground, in the shadow of the woods, allowing an approach within a distance which would have rendered its capture with a ring-net an easy matter. Its manners bore some resemblance to those of the *Satyridæ*.

32. *Cystineura Mardania*. This again is one of the most abundant of insects in those parts of Jamaica with which I am

familiar, more especially those which are of low or moderate elevation. Around Bluefields and along the neighbouring shore it is particularly numerous at all seasons. It flies low, alighting but little, proceeding with a dancing or jerking motion over the herbage, with no great rapidity, so that it becomes an easy booty to the entomologist.

33. *Nica Cadma.* I took this once in April, in a pasture behind Bluefields, and two or perhaps three times, on the Hampstead Road in June and July. When in good condition the purple flush upon the red of the posterior wings is very rich and beautiful.

34. *Eubagis Zetes.* In the month of June I first met with this little butterfly about midway between Bluefields and Savanna le mer; two or three specimens then occurred, not exactly associated, and yet not far from each other. They were playing about some shrubs by the road-side and were easily caught. A few others occurred in July, after which I saw it no more. I think on all occasions that I met with the species, which were but few, I found several at no great distance from each other. It seems a lowland species, and limited in the season of its activity to the middle of summer.

[To be continued.]

XX.—*An Account of the Germination of* Isoëtes lacustris. By KARL MÜLLER*.

[With two Plates.]

[Continued from p. 93.]

5. *From the epoch when the Germ-plant breaks through to the formation of the second Leaflet.*

IN the germinal body (*Keimkörper*) may be distinguished: 1, the reservoir for nutrient matter mentioned in foregoing paragraphs. To facilitate the descriptions I will call this the *alimentary organ* (*Nahrungsspeicher*); 2, *the matrix of the root*; 3, *the vagina*; 4, *the scale of the first leaf*; 5, *the cell of the second leaf*, or to describe it in more general terms, the point of gemmation for all the following leaves; 6, *the first leaf*. I shall have to consider these in a somewhat different order, in accordance with the development of the plant.

1. The *Alimentary Organ.*—This part of the germinal body

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* Translated by Arthur Henfrey, F.L.S., from the Botanische Zeitung, April 28, 1848.